

FORM PTO-1449
(REV. 7-80)U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICEATTY. DOCKET NO.
500789.01APPLICATION NO.
09/247,343**INFORMATION DISCLOSURE STATEMENT***(Use several sheets if necessary)*APPLICANTS
ROUNDHILL, David N. et al.

FILING DATE

GROUP ART UNIT

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	AA	4,679,565	Jul., 1987	Sasaki			
	AB	4,702,258	Oct., 1987	Nicolas			
	AC	4,714,071	Dec., 1992	Pesque			
	AD	5,158,071	Oct., 1993	Monaghan			
	AE	5,410,516	Apr., 1995	Uhlendorf et al.			
	AF	5,415,171	May, 1995	Goh			
	AG	5,419,328	May, 1995	Goh			
	AH	5,435,311	Jul., 1995	Umemura			
	AI	5,608,690	Mar., 1997	Hossack et al.			
	AJ	5,740,128	Apr., 1998	Hossack et al.			
	AK	5,833,613	Nov., 1998	Averkiou et al.			
	AL	5,848,968	Dec., 1998	Takeuchi			
	AM	5,873,829	Feb., 1999	Kamiyama			
	AN	5,879,303	Mar., 1999	Averkiou et al.			
	AO	5,928,151	Jul., 1999	Hossack et al.			

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
	AP	WO 98/20361	May 1998					
	AQ	WO 98/57583	Dec. 1998					

OTHER PRIOR ART *(Including Author, Title, Date, Pertinent Pages, Etc.)*

	AR	Williams, A.R. "Ultrasound Imaging Technique using Non-Linear Scattering from Bubble", Intl. Appln (PCT) WO 91/15999 Published Oct. 31, 1991 based upon PCT/GB91/00649.
	AQS	Starritt, "Evidence For Ultrasonic Finite Amplitude Distortion In Muscle Using Medical Equipment," <i>JASA</i> 77(1), pp. 302-306, Jan. 1985.
	AT	Muir, "Prediction Of Nonlinear Acoustic Effects At Biomedical Frequencies And Intensities," <i>Ult. in Med. & Biol.</i> Vol. 6, pp. 345-57, 1980.
	AU	Carstensen, "Demonstration Of Nonlinear Acoustical Effects At Biomedical Frequencies And Intensities," <i>Ult. in Med. & Biol.</i> Vol. 6, pp. 359-68, 1980.
	AV	Starritt, "The Development Of Harmonic Distortion In Pulsed Finite-Amplitude Ultrasound Passing Through Liver," <i>Phys. Med. Biol.</i> , Vol. 31, No. 12, 1401-09, 1986.

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BA	Ward, "Non-Linear Propagation Applied To The Improvement Of Lateral Resolution In Medical Ultrasound Scanners," <i>World Cong. on Ult.</i> pp. 965-68, 1995.
BB	Law, "Ultrasonic Determination Of The Nonlinearity Parameter B/A For Biological Media," <i>JASA</i> 69, (4), pp. 1210-1212, Apr. 1981.
BC	M. Averkiou et al., "Measurements Of Harmonic Generation In A Focused Finite-Amplitude Sound Beam," <i>J. Acoust. Soc. Am.</i> , 98(6) pp. 3439-3442, Dec. 1995.
BD	M. Averkiou et al., "Self-Demodulation Of Amplitude-And Frequency-Modulated Pulses In A Thermoviscous Fluid," <i>J. Acoust. Soc. Am.</i> , 94(5) 2876-2883, Nov. 1993.
BE	B. Ward et al., "Nonlinear Propagation Applied To The Improvement Of Resolution In Diagnostic Medical Ultrasound," <i>J. Acoust. Soc. Am.</i> , 101(1), pp. 143-154, Jan. 1997.
BF	B. Schrope et al., "Simulated Capillary Blood Flow Measurement Using a Nonlinear Ultrasonic Contrast Agent," <i>Ultrasonic Imaging</i> 14, pp. 134-58, Aca. Press, 1992.
BG	T. Porter, "Improved Myocardial Contrast With Second Harmonic Transient Ultrasound Response Imaging in Humans Using Intravenous Perfluorocarbon-Exposed Sonicated Dextrose Albumin," <i>JACC</i> , 27(6), pp. 1497-1501, May 1996.
BH	B. Schrope et al., "Second Harmonic Ultrasonic Blood Perfusion Measurement, Ult.," <i>Med. & Biol.</i> 19(7), pp. 567-579, Pergamon Press, 1993.
BI	T. Christopher, "Finite Amplitude Distortion and its Relationship to Linear Derating Formulae for Diagnostic Ultrasound Systems, Ult.," <i>Med. & Biol.</i> 22(8), 1103-1116, 1996.
BJ	F. Dunn et al., "Nonlinear Ultrasonic Wave Propagation In Biological Materials," <i>Ultrasonics Symposium, IEEE</i> , pp. 527-532, 1981.
BK	T. Muir, "Nonlinear Effects in Acoustic Imaging, Acoustical Imaging," Vol. 9, pp. 93-109 Plenum Press, NYC, 1980.
BL	N. Ichida et al., "Imaging The Nonlinear Parameter of a Medium, Ultrasonic Imaging," Vol. 5, pp. 295-99, Academic Press, 1983.
BM	T. Christopher, "Finite Amplitude Distortion-Based Inhomogeneous Pulse Echo Ultrasonic Imaging," <i>IEEE Trans. Ult., Ferro. & Freq. Conti.</i> , Vol. 44, p. 123, Jan., 1997.
BN	P.N. Burns et al., "Harmonic Power Mode Doppler Using Microbubble Contrast Agents," <i>J.E.M.U. V.</i> 16, No. 4, pp. 132-142, Masson, Paris, 1995.
BO	P.N. Burns, "Harmonic Imaging With Ultrasound Contrast Agents," <i>Clin. Radiology</i> , V. 51, Suppl. 1, pp. 50-55, Great Britain, 1996.
BP	P.N. Burns et al., "Harmonic Imaging Principles and Preliminary Results," <i>Angiology</i> , Vol. 47, No. 7 Part 2, pp. 563-574, New York, July, 1996.
BQ	P.N. Burns, Presentation of Papers Nos. 241, 243, 1046, 1438, 1682, 166 Supplements to Radiology (Nov. 1992 v. 185, Nov. 1993 v. 189, Nov. 1994 v. 193, Nov. 1995 v. 197 Nov. 1996 v. 201).
BR	M. Averkiou, "Experimental Investigation of Propagation and Reflection Phenomena in Finite Amplitude Sound Beams," Ph.D. thesis, Univ. of Texas, May 1994.

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CA	Thomas R. Porter et al., "Improved Myocardial Contrast With Second Harmonic Transient Ultrasound Response Imaging in Humans Using Intravenous Perfluorocarbon-Exposed Sonicated Dextrose Albumin," <i>Proc IEEE Ultrasonic Symposium</i> , pp. 1-7, 1994.
CB	Peter N. Burns, Ph.D., et al., "Harmonic Imaging Principles and Preliminary Results, Angiology," <i>The Journal of Vascular Diseases</i> , pp. S63-S74, Vol. 47, No. 7, Part 2, July, 1996.
CC	B. Ward et al., "Nonlinear Propagation Applied to the Improvement of Resolution in Diagnostic Medical Ultrasound," <i>J. Acoustical Society of America</i> 101 (1), pp. 143-155, January, 1997.
CD	H.C. Starritt et al., "Evidence for Ultrasonic Finite-Amplitude Distortion in Muscle Using Medical Equipment," pp. 302-306, <i>Acoustical Society of America</i> 77 (1), January, 1985.
CE	T.G. Muir et al., "Prediction of Nonlinear Acoustic Effects at Biomedical Frequencies and Intensities," <i>Ultrasound in Med. & Biol.</i> , Vol. 6, pp. 345-357, 1980.
CF	E.L. Carstensen, "Demonstration of Nonlinear Acoustical Effects at Biomedical Frequencies and Intensities," <i>Ultrasound in Med. & Biol.</i> , Vol. 6, pp. 359-368, 1980.
CG	H.C. Starritt et al., "The Development of Harmonic Distortion in Pulsed Finite-Amplitude Ultrasound Passing Through Liver," <i>Phys. Med. Biol.</i> , Vol. 31, No. 12, pp. 1401-1409, 1986.
CH	B. Ward et al., "Non-Linear Propagation Applied to the Improvement of Lateral Resolution in Medical Ultrasound Scanners," <i>World Congress On Ultrasonics</i> , pp. 965- 968, 1995.
CI	Adler L, Hiedermann EA., "Determination of the nonlinearity parameter B/A for water and m-Xylene," <i>J Acoust Soc. Am.</i> , 34:410-412, 1962.
CJ	Averkio MA, Hamilton MF., "Measurements of harmonic generation in a focused finite-amplitude sound beam," <i>Journal of the Acoustical Society of America</i> , 98(6):3439-3442, 1995.
CK	Bacon DR, "Finite amplitude distortion of the pulsed fields used in diagnostic ultrasound," <i>Ultrasound Med Bio.</i> , 189-195, 1984.
CL	Burns PN, Goldberg BB, "Ultrasound contrast agents for vascular imaging," <i>Cavaye M, Whit RA, eds., A Text and Atlas of Arterial Imaging</i> . London: Chapman Hall Medical, 62-8, 1992.
CM	Burns PN, Halliwell M, Wells PNT, Webb AJ, "Ultrasonic Doppler studies of the breast," 8:127-143, 1982.
CN	Burns PN, Jaffe CC. "Quantitative Doppler flow measurements: techniques, accuracy and limitations," <i>Radiol Clin. North Am.</i> , 23(4) pp. 641-657, 1985.
CO	Burns PN, Taylor KJ, Burns PN, Wells PNT, "Interpretation of Doppler ultrasound signals," New York, Raven Press, <i>Clinical Applications of Doppler Ultrasound</i> , 1987.
CP	Burns PN, "Doppler Flow Estimations In The Fetal And Internal Circulation Principles Techniques and Some Limitations," Maulik D, McNellis MD, eds., <i>Doppler Ultrasound Measurement Of Maternal-Fetal Hemodynamics</i> , Ithaca, Perinatology Press, 1987:
CQ	Burns PN, Needleman L, Merton D, Goldberg BB, "Criteria For The Detection Of Tumor Blood Flow With Doppler US, (RSNA presentation), <i>Radiology</i> , 173:180, 1989.
CR	Burns PN, Hilpert P, Goldberg BB. "Intravenous contrast for ultrasound Doppler: in vivo measurement of small vessel dose-response," <i>IEEE Eng Med Biol. Soc.</i> , 322-324, 1990.

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	DA	Burns PN, Liu J-B, Hilpert P, Goldberg BB, "Intravenous US contrast agent for tumor diagnosis," <i>Quantitative studies</i> , Radiology, 177 (P):142 (Abstr), 1990.
	DB	Burns PN, "Ultrasound Contrast Agents," <i>Initial Experience</i> , Br. J. Radiol., Proc.BIR., 1991
	DC	Burns P. "Contrast Agents For Diagnostic Ultrasound Their Potential And Limitations," <i>UFFC Ultrasonics Symposium</i> , Tucson: IEEE, p.113, 1992.
	DD	Burns PN, Power JE, Fritsch T., "Harmonic Imaging: A New Imaging And Doppler Method For Contrast Enhanced Ultrasound," <i>Radiology</i> , 185(P):142 (Abstr), 1992.
	DE	Burns PN, Powers JE, Hope Simpson D, Uhlenndorf V, Fritsch T., "Harmonic Contrast Enhanced Doppler As A Method For The Elimination Of Clutter- In Vivo Duplex And Color Studies," <i>Radiology</i> , 189:285, 1983.
	DF	Burns P., "Harmonic Imaging And Doppler Using Microbubble Contrast Agents," <i>UFFC Ultrasonics Symposium, Baltimore: IEEE</i> , p. 29, 1993.
	DG	Burns PN, Powers JE, Hope Simpson D, Uhlenndorf V, Fritsch T. "Harmonic Imaging And Doppler Using Microbubble Contrast Agents: A New Method For Contrast Imaging," <i>Ultrasound Med. Biol.</i> , p. 20:S72, 1994.
	DI	Burns PN., "Recent Advances In Color Doppler Performance," <i>Ultrasound Med. Biol.</i> , 20:S20, 1994.
	DJ	Burns PN., "Contrast-Enhanced Studies: How We Can Use Present Instruments," <i>Ultrasound Med.</i> , 14:S50, 1995.
	DK	Burns PN., "Doppler Artifacts." Taylor KJW, Burns PN, Wells PNT, eds. <i>Clinical Applications of Doppler Ultrasound</i> , New York, Raven Press, pp. 46-76. Vol. 2, 1995.
	DL	Burns PN, Fritsch T, Weitsches W, Uhlenndorf V, Hope Simpson D, Powers JE, "Pseudo Doppler Shifts From Stationary Tissue Due To The Stimulated Emission Of Ultrasound From A New Ultrasound Contrast Agent." <i>Radiology</i> , 197(P):577, 1995.
	DM	Burns PN, Powers JE, Hope Simpson D, Uhlenndorf V, Fritsch T., "Harmonic Imaging: Principles and Preliminary Results," <i>Angiology</i> , In press, 1995.
	DN	Burns PN, Powers JE, Hope-Simpson D, et al., "Iõimagerie Harmonique En Mode Doppler Puissance A Lõaide De Produits De Contraste a Microbulles," <i>JEMU</i> , 16(4) pp. 132-142, 1995.
	DO	Burns PN, "Contrast Agents for Doppler Ultrasound," Taylor KJW, Burns PN, Wells PNT, eds., <i>Clinical Applications of Doppler Ultrasound</i> , New York, Raven press, pp. 367-381. Vol. II, 1995.
	DP	Burns PN, Powers JE, Hope Simpson D, et al., "Harmonic Power Mode Doppler Using Microbubble Contrast Agents: an Improved Method for Small Vessel Flow Imaging," <i>Proc IEEE UFFC</i> , pp. 1547-1550, 1997.
	DQ	Burns PN. "Harmonic imaging with ultrasound contrast agents." <i>Clinical Radiology</i> , pp. 51, 114-119, 1996.
	DR	Carstensen EL, Law WK, McKay ND, Muir TG, "Demonstration of nonlinear acoustical effects at biomedical frequencies and intensities," <i>Ultrasound Med. Biol.</i> , 1(1)pp. 359-368, 1980.
	DS	Christopher T., "Finite Amplitude Distortion-Based Inhomogeneous Pulse Echo Ultrasonic Imaging," <i>IEEE Trans. Ultrason. Ferroelec. Freq. Contr.</i> , 44(1) pp.125-139, 1997.

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EA	de Jong N., "Acoustic Properties of Ultrasound Contrast Agents [Ph.D.]," <i>Rotterdam: Erasmus University</i> , 1993.
EB	Fritsch T, Hauff P, Scholle FD, Uhlendorf V., "Second Harmonic Response Of A Polymer Coated Microbubble Suspension," <i>J Ultrasound Med.</i> , 15:S57, 1996.
EC	Law WK, Frizzel LA, Dunn F., "Ultrasonic Determination Of The Nonlinearity Parameter B/A For Biological Media," <i>J. Acoust Soc. Am.</i> , pp. 69, 1210-1212, 1981.
ED	Lizzi FL, Greenebaum M, Feleppa EJ, Elbaum M, Coleman DJ, "Theoretical Framework For Spectrum Analysis In Ultrasonic Tissue Characterization," <i>Acoustic Society of America</i> , pp. 74, 1366-1373, 1983.
EE	Lizzi FL, Ostromogilsky M, Feleppa EJ, Rorke MC, Yaremko MM, "Relationship Of Ultrasonic Spectral Parameters To Features Of Tissue Microstructure," <i>UFFC, ed. IEEE Trans Ultrasonics Ferroelectrics Frequency Control</i> , pp. 319-329, 1987.
EF	Miller DL., "Ultrasonic Detection Of Resonant Cavitation Bubbles In A Flow Tube By Their Second Harmonic Emissions," <i>Ultrasonics</i> , 1981.
EG	Mulvagh SL, Foley D, Aeschbacher BC, Klarich KK, Seward JB, "Second Harmonic Imaging of an Intravenously Administered Echocardiographic Contrast Agent," <i>Journal of American College of Cardiology</i> , 27(5), pp.1519-1525, 1996.
EH	Neppiras EA, Nyborg WL, Miller PL., "Nonlinear behavior and stability of trapped micron-sized cylindrical gas bubbles in an ultrasound field," <i>Ultrasonics</i> , pp. 21, 109-115, 1983.
EU	Plesset MS., "The Dynamics of Cavitation Bubbles," <i>J. Appl. Mech.</i> , pp. 16, 272-282, 1949.
EJ	Porter TR, Xie F, Kricsfeld D, Armbruster RW., "Improved Myocardial Contrast With Second Harmonic Transient Ultrasound Response Imaging in Humans Using Intravenous Perfluorocarbon-Exposed Sonicated Dextrose Albumin," <i>Journal of American College of Cardiology</i> , pp. 27(6) 1497-1501, 1996.
EK	Powers Je, Burns PN, Souquet J., "Imaging Instrumentation for Ultrasound Contrast Agents," Nanda N, Schlieff R, Goldberg B, eds., <i>Advances in Echo Imaging Using Contrast Enhancement</i> . Second ed. Dordrecht, The Netherlands: Kluwer Academic Publishers, 1996:
EL	Powers J., "Contrast Agents in Echocardiography," Bothell, WA: ATL, 1996:
EM	Schrope BA, Newhouse VL., "Second Harmonic Ultrasonic Blood Perfusion Measurement," <i>Ultrasound in Medicine and Biology</i> , pp. 19(7) 567-579, 1993.
EN	Schrope B, Newhouse VL, Uhlendorf V., "Simulated Capillary Flow Measurement Using A Nonlinear Ultrasonic Contrast Agent," <i>Ultrasonic Imaging</i> , pp.14, 134-158, 1992.
EO	Ward B, Baker AC, Humphrey VF. Nonlinear propagation applied to the improvement of resolution in diagnostic medical ultrasound. <i>J. Acoust. Soc. Am.</i> 1997;101(1):143-154.
EP	Welsby VG, Safar MH, "Acoustic Nonlinearity Due To Microbubbles In Water," <i>Acustica</i> , pp. 22:177-182, 1969.
EQ	Wu J, Zhu Z., "Measurements Of The Effective Nonlinear Parameter B/A Of Water Containing Trapped Cylindrical Bubbles," <i>J. Acoust. Soc. Am.</i> , pp. 89, 2634-2639, 1991.

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	FA	P.N. Burns et al, "Harmonic Power Mode Doppler Using Microbubble Contrast Agents," <i>Proc IEEE Ultrasonic Symposium</i> , 1994.			
EXAMINER			DATE CONSIDERED		
* EXAMINER: Initial if reference considered, whether or not criteria is in conformance with MPEP 609. Draw line through citation if not in conformance <u>and</u> not considered. Include copy of this form with next communication to applicant(s).					